

FORM PTO-1390 (Mod:ed)
(REV 10-95)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

1481

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/763068

INTERNATIONAL APPLICATION NO.
PCT/CH 99/00426INTERNATIONAL FILING DATE
SEPTEMBER 13, 1999PRIORITY DATE CLAIMED
SEPTEMBER 21, 1998

TITLE OF INVENTION

CANDLE FILTER ELEMENT

APPLICANT(S) FOR DO/EO/US

Patrick MUELLER, Ivo SCHUMACHER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ A copy of the International Search Report (PCT/ISA/210).
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
9. ☒ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 18 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☐ A **FIRST** preliminary amendment.
A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter.
18. ☒ Certificate of Mailing by Express Mail
19. ☐ Other items or information:

EF 215953 092 US

U.S. APPLICATION NO. IF KNOWN, SEE 37 CFR 09/763068	INTERNATIONAL APPLICATION NO. PCT/CH 99/00426	ATTORNEY'S DOCKET NUMBER 1481
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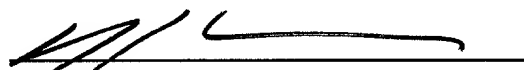
20. The following fees are submitted:				CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :					
<input type="checkbox"/> Search Report has been prepared by the EPO or JPO \$930.00					
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) \$720.00					
<input type="checkbox"/> No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) \$790.00					
<input checked="" type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$1,070.00					
<input type="checkbox"/> International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) \$98.00					
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$1,000.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).				\$0.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	5 - 20 =	0	x \$18.00	\$0.00	
Independent claims	1 - 3 =	0	x \$80.00	\$0.00	
Multiple Dependent Claims (check if applicable).			<input type="checkbox"/>	\$0.00	
TOTAL OF ABOVE CALCULATIONS =				\$1,000.00	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable).			<input checked="" type="checkbox"/>	\$500.00	
SUBTOTAL =				\$500.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).				\$0.00	
TOTAL NATIONAL FEE =				\$500.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable).			<input checked="" type="checkbox"/>	\$40.00	
TOTAL FEES ENCLOSED =				\$540.00	
				Amount to be:	
				refunded	\$
				charged	\$

- ☐ A check in the amount of _____ to cover the above fees is enclosed.
- ☒ Please charge my Deposit Account No. **19-4675** in the amount of **\$540.00** to cover the above fees.
A duplicate copy of this sheet is enclosed.
- ☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **19-4675** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

STRIKER, STRIKER & STENBY 103 EAST NECK ROAD HUNTINGTON, NEW YORK 11743
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SIGNATURE
MICHAEL J. STRIKER
NAME
27233
REGISTRATION NUMBER
FEBRUARY 16, 2001
DATE

Candle filter element

The invention relates to a candle filter element for assembly in a pressurized container, consisting of a support body disposed around a central tube with a closed surface, over which a filter cloth is stretched, wherein the support body is formed as a multi-lobed sheath element.

A candle filter element of this type is known from EP-A 0066921. The known filter element has support bodies in the form of a tube bundle. However, the use of tube bundles creates problems with regard to cleaning, especially before a change of product. Product residues in the interstices between the individual tubes are only partially, or not at all, removable. This applies particularly to filtration of food, pharmaceutical and biotechnological products where CIP (cleaning in place) or SIP (sterilization in place) is necessary.

The problem of the invention is to provide a filter element that is of simple and sturdy construction and extracts solids efficiently, yet ensures thorough cleaning.

In accordance with the invention this problem is solved by disposing the sheath element around the central tube and forming it in a series of semicircular curves. The support body now consists of an outer sheath, which is disposed around a central tube. This has the advantage that difficult-to-clean points of contact between individual support elements are eliminated. At the same time, a saving in material, and therefore weight, can be made, and the surface area to be cleaned can be reduced.

It is advisable to form the sheath element with at least two, and preferably at least three, lobes. With fewer than three curves in the sheath, the cleaning effect is not adequate.

It is convenient to join the sheath element to the central tube. The central tube can then be taken out together with the support body. This has the advantage that the candle

filter element can be made pressure-proof. Taking out the central tube has the further advantage that the interstices can be exposed for cleaning.

It has been found particularly advantageous to form the curves in the sheath element as semicircles. The curved support body has the advantage that there are no corners or edges to damage the e.g. textile filter medium during filtration. The rounded shape of the support body extends the service life of the filter medium.

In one configuration the surface of the sheath element is provided with openings. These drainage openings may be round or angular, square, polygonal or oblong, or formed as slits.

Openings formed as slits have proved particularly advantageous. They should extend at an angle α of less than 120° , in particular between 60° and 120° , to the axis of the sheath element. An angle of less than 60° has the drawback that the sturdiness of the sheath is no longer assured; and the same applies to angles of more than 180° . The most suitable material has been found to be stainless or special steel as used in the food and pharmaceutical industry.

The invention will now be described in detail with reference to a drawing, in which are shown schematically:

In Fig. 1, a longitudinal section through the candle filter element according to the invention

In Fig. 2, the candle filter element in cross-section

In Fig. 3, the cross-section of a four-lobed support body of the candle filter element

In Fig. 4, the cross-section of a three-lobed support body of the candle filter element

In Fig. 5, one variant of the six-lobed sheath element of the candle filter element, joined to the central tube

In Fig. 6, the cross-section of a four-lobed sheath element of the candle filter element, joined to the central tube

In Fig. 7, the cross-section of a three-lobed sheath element of the candle filter element, joined to the central tube.

In Fig. 1 a bottom end of the candle filter element carries the reference number 1. A sheath element 4, which is joined to a central tube 3, is arranged between the bottom end 1 and a head part 2. The central tube 3 has a closed surface over its entire length. A filter medium 5, preferably of woven cloth, is arranged over the sheath element 4. A coupling 6 for fixing the candle filter element inside a container (not shown) is provided in the head part 2. The sheath element 4 is partly provided with openings 7 appearing in the right-hand part of Fig. 1 as (by way of example) circular holes, and in the left-hand part of Fig. 1 as slits forming an angle α with the axis of the sheath element.

When in operation, the candle filter element is arranged in the container (not shown). Filtration takes place through the filter medium 5 from the outside inwards, through the openings 7 in the sheath element 4, with the clarified filtrate collecting between the sheath element 4 and the central tube 3. The filtrate enters the lower part of the central tube 3 and leaves the central tube 3 through its upper opening, passing into the filtrate chamber (not shown) of the filter container. The run-off of filtrate is substantially improved by the openings 7 in the sheath element 4.

Fig. 2 shows a six-lobed sheath element 4 mounted on the central tube 3 with the filter medium 5 in the filtration condition (unbroken line) and in the inflated condition during cleaning (dotted line). The filter medium 5 is stretched over the sheath element 4 so that it forms a wavy surface during filtration from the outside inwards and has a round cross-section during backwashing.

In Figs. 3 and 4 the central tube 3 is provided with the sheath element 4 which has different lobe configurations.

In Fig. 5 the sheath element is composed of six individual sheath parts 4', 4'', etc. The individual sheath parts 4', 4'', etc. are attached to the central tube 3 at the points 8.

[illegible]

Claims

1. Candle filter element for assembly in a pressurized container, consisting of a support body disposed around a central tube (3) with a closed surface, over which a filter cloth (5) is stretched, wherein the support body is formed as a multi-lobed sheath element (4), characterized in that the sheath element (4) is arranged around the central tube (3) and the curves described by the sheath element (4) are semicircles.
2. Candle filter element according to Claim 1, characterized in that the surface of the sheath element (4) has openings (7).
3. Candle filter element according to Claim 2, characterized in that the openings (7) are circular.
4. Candle filter element according to Claim 2, characterized in that the openings (7) are formed as slits.
5. Candle filter element according to Claim 4, characterized in that the openings formed as slits (7) forms an angle α of less than 120° with the axis of the sheath element (4).

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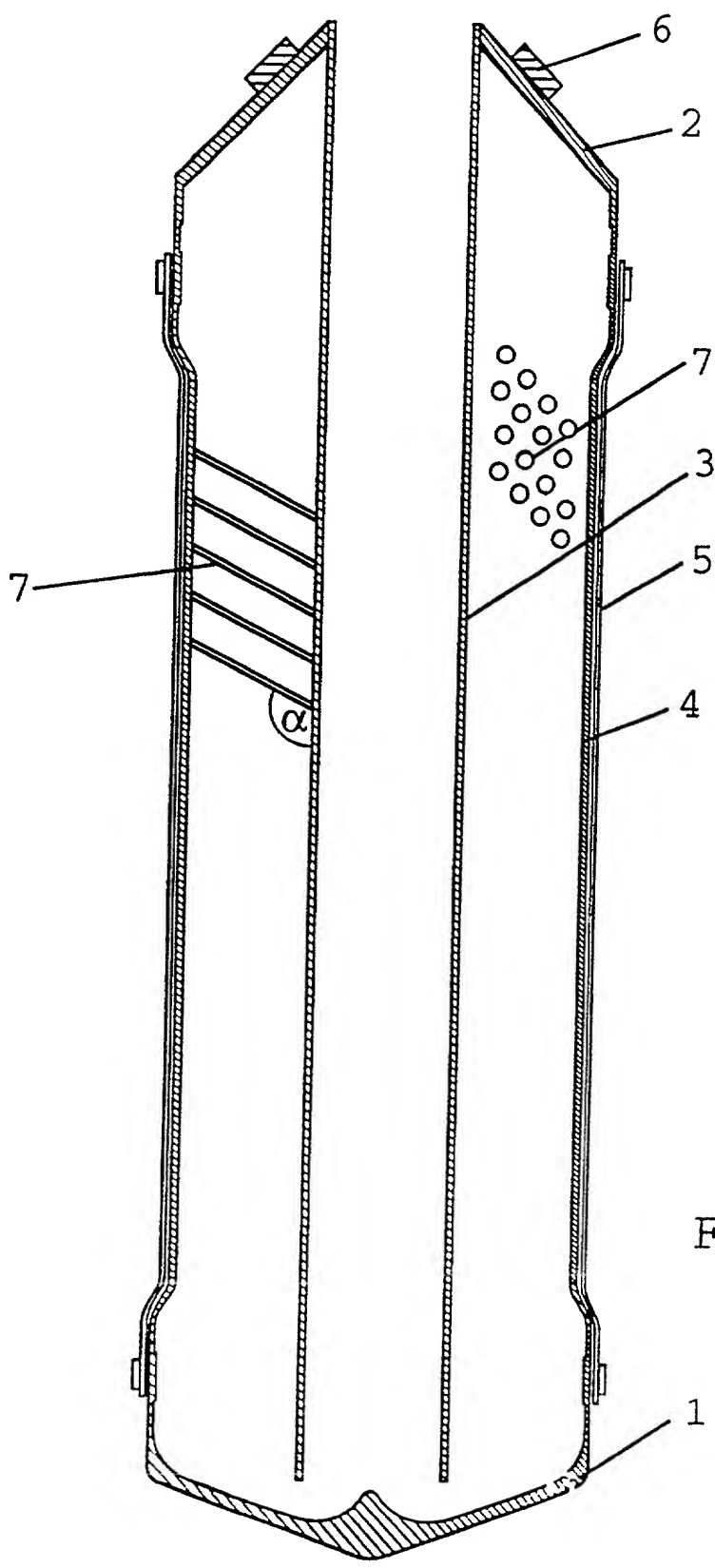


Fig. 1

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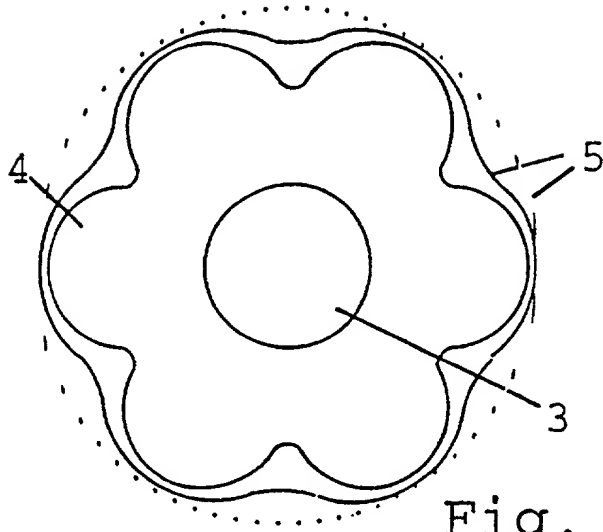


Fig. 2

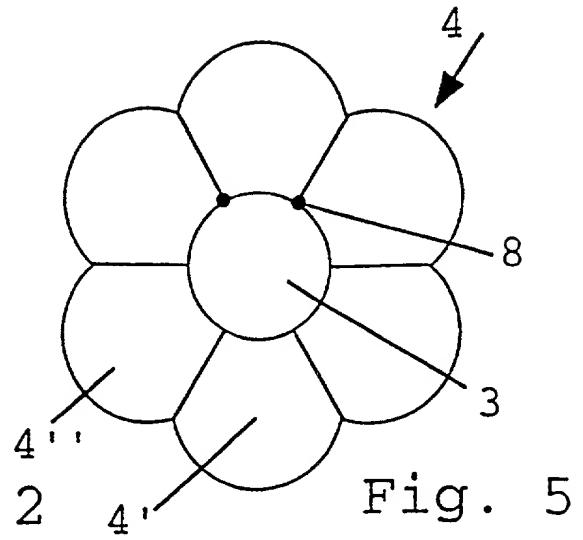


Fig. 5

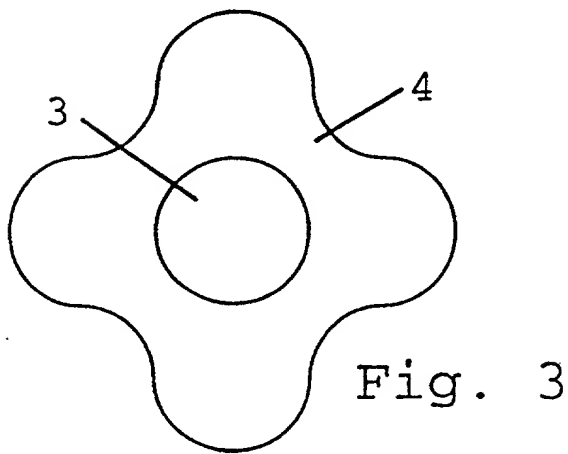


Fig. 3

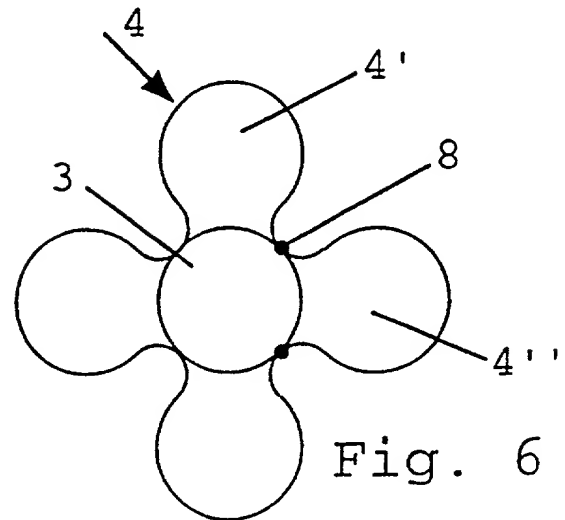


Fig. 6

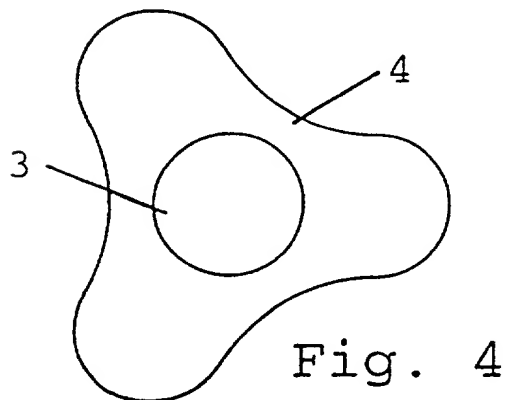


Fig. 4

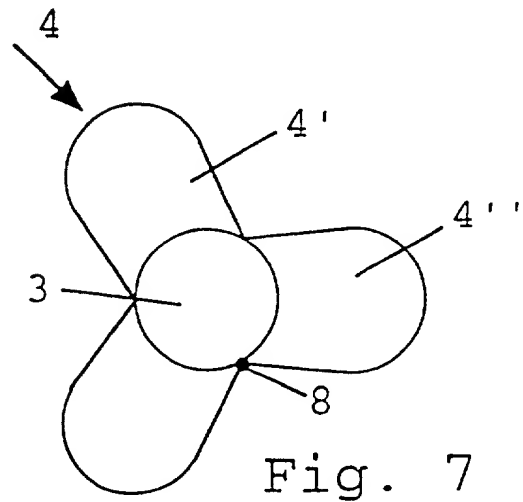


Fig. 7

DECLARATION AND POWER OF ATTORNEY FOR NATIONAL STAGE OF PCT PATENT APPLICATION

As a below-named inventor, I hereby declare that:

Patrick MUELLER
Ivo SCHUMACHER

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **CANDLE FILTER ELEMENT** the specification of which was filed as PCT International Application number PCT/CH 99/00426 on September 13, 1999.

I hereby state that I believe the named inventor or inventors in this Declaration to be the original and first inventor or inventors of the subject matter which is claimed and for which a patent is sought.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365 (b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior foreign application(s):

Priority claimed:

<u>1924/98</u>	<u>SWITZERLAND</u>	<u>September 21, 1998</u>	<u>X</u>	
(Number)	(Country)	(Date filed)	Yes	No
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
(Number)	(Country)	(Date filed)	Yes	No

As a named inventor, I hereby appoint the following attorney to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Michael J. Striker, Reg. No. 27233

Direct all telephone calls to Striker, Striker & Stenby at telephone no.: (631) 549 4700 and address and all correspondence to:

STRIKER, STRIKER & STENBY
103 East Neck Road
Huntington, New York 11743
U.S.A.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statement may jeopardize the validity of the application or any patent issued thereon.

Signature: <u>A. P. M. G.</u>	Date: <u>2/3/01</u>	Residence and Full Postal Address: Glaernischstrasse 65 CH-8712 <u>Staefa</u> Switzerland <u>CHX</u>
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Signature: <u>I. Schumacher</u>	Date: <u>2/5/01</u>	Residence and Full Postal Address: Zuercherstrasse 178 CH-8645 <u>Jona</u> Switzerland <u>CHX</u>
Full Name of Second Inventor: <u>Ivo SCHUMACHER</u>	Citizenship: SWISS	
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Signature:	Date:	Residence and Full Postal Address:
Full Name of Fourth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Fifth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Sixth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Seventh Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Eighth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Ninth Inventor:	Citizenship:	

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